

Date: Monday, 1/23/2006 7:56:04 AM  
 User: Kim Johnston

## Process Sheet

<b>Customer</b> : CU-DAR001 Dart Helicopters Services	<b>Drawing Name</b> : ROUND BILLET 17-4
<b>Job Number</b> : 25595	
<b>Estimate Number</b> : 10041	
<b>P.O. Number</b> : N/A	<b>Part Number</b> : D6104007
<b>This Issue</b> : 1/23/2006 <b>S.O. No.</b> : N/A	<b>Drawing Number</b> : D6104 REV B
<b>Prsht Rev.</b> : NC	<b>Project Number</b> : N/A
<b>First Issue</b> : N/A <b>Type</b> : MACHINED PARTS	<b>Drawing Revision</b> : B
<b>Previous Run</b> : 25594A	<b>Material</b> : N/A
<b>Written By</b> : SEE COMMENT BELOW	<b>Due Date</b> : 2/15/2006 <b>Qty:</b> 24 <b>Um:</b> Each
<b>Checked &amp; Approved By</b> : SEE ABOVE USER & DATE	
<b>Comment</b> : Est. A: 01.05.08 New Issue EC	

## Additional Product

Job Number:



<b>Seq. #:</b>	<b>Machine Or Operation:</b>	<b>Description :</b>
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1.0	PG	PURCHASING
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**Comment:** PURCHASING

Issue P/O: 00000627

06/02/20

a) Description: S.S round billet

b) Ø4.50" x 5.10" long

c) Tolerance on all dimensions are +0.030"/-0.000"

d) Material: 17-4PH Stainless steel (Ams 5643 or Aisi 630)

e) One blank makes 2 parts

f) Material certification required

2.0	D6104007	17-4 SS Roundbar 4.50"OD
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**Comment:** Qty.: 1.0000 Each(s)/Unit Total: 24.0000 Each(s)  
 17-4 SS Roundbar 4.50"OD

3.0	PACKAGING 1	PACKAGING RESOURCE #1
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**Comment:** PACKAGING RESOURCE #1

Receive &amp; Inspect For Transit Damage

Ensure material certification is attached

04/27 64

4.0	QC6	DIMENSIONAL CHECK
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**Comment:** DIMENSIONAL CHECK

Ensure Material certification comply to Dwg D6104

RG 06.02.27

24

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: PD Date: 04/02/20  
 QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Date: Monday, 1/23/2006 7:56:04 AM  
User: Kim Johnston

## Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: ROUND BILLET 17-4

Job Number: 25595

Part Number: D6104007

Job Number:



Seq. #:

Machine Or Operation:

Description :

5.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Identify and Stock

Location: \_\_\_\_\_

C 206/02/27

6.0

DC

DOCUMENT CONTROL



Comment: DOCUMENT CONTROL

Inspection Level 21

D 06/02/28 (27)

Job Completion



U 06/02/28

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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NOTE: Date & initial all entries

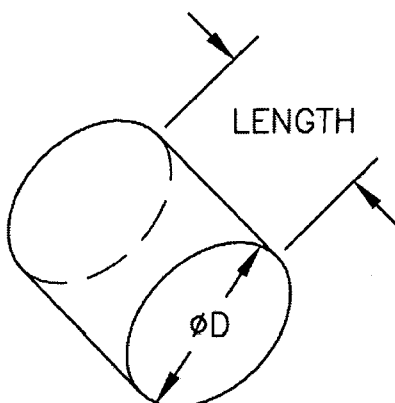


DESIGN RF	DRAWN BY [Signature]	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED [Signature]	APPROVED [Signature]	DRAWING NO. D6104	Rev. B SHEET 1 OF 1
DATE 02.11.25		TITLE ROUND BILLET, 17-4	SCALE NTS
A	01.04.10	NEW ISSUE	
B	02.11.25	CLARIFY ALLOY SPEC ADDED D6104-009/-011 REDUCE LENGTH OF BILLETS	

RELEASED

02.11.29 [Signature]

## SPECIFICATION CONTROL DRAWING



MATERIAL: 17-4 PH SS (AMS 5643 OR AISI 630) MIN UTS = 170 KSI (38 HRC)

PURCHASE MATERIAL ACCORDING TO THE FOLLOWING TABLE. SPECIFY ALLOY, DIAMETER x LENGTH (+0.030/-0.000) AS SHOWN.

TOLERANCE ON ALL DIMENSIONS IS +0.030/-0.000.

ALL DIMENSIONS ARE IN INCHES

Part No.	Alloy	D (Diameter)	Length
D6104-001	17-4 PH STAINLESS STEEL	Ø3.00	3.80
D6104-003	17-4 PH STAINLESS STEEL	Ø3.25	3.80
D6104-005	17-4 PH STAINLESS STEEL	Ø4.00	5.10
D6104-007	17-4 PH STAINLESS STEEL	Ø4.50	5.10
D6104-009	17-4 PH STAINLESS STEEL	Ø5.25	4.10
D6104-011	17-4 PH STAINLESS STEEL	Ø6.50	4.10

02.11.25  
HEIDRICH  
ENGINEERING  
CONTROLLED COPY  
SUBJECT TO AMENDMENT  
WITHOUT NOTICE  
WORK ORDER  
NO 25595

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# COPPER AND BRASS SALES

## MATERIAL TYPE STAINLESS STEEL

AISI SERIES  
200 300 400  
AND  
PRECIPIT HARDENING GRADES

## "WARNING"

INHALATION OF FUMES, FRESHLY GENERATED BY THE WELDING OF STAINLESS STEEL CONTAINING ONE OR MORE OF THE FOLLOWING INGREDIENTS, ZINC, MAGNESIUM OR COPPER, ARE KNOWN TO CAUSE METAL FUME FEVER. INHALATION OF DUST OR FUME FROM STAINLESS STEEL CONTAINING ONE OR MORE OF THE FOLLOWING INGREDIENTS, ALUMINUM, IRON, MANGANESE, SELENIUM, OR TIN, HAS ALSO BEEN REPORTED TO CAUSE METAL FUME FEVER AND MAY CAUSE IRRITATION TO THE RESPIRATORY TRACT AND/OR AGGRAVATE PRE-EXISTING CONDITIONS. TARGET ORGAN IS PRIMARILY THE LUNG.

THIS PRODUCT CONTAINS CHROMIUM. EXPOSURE TO CHROMIUM DUST OR FUME MAY CAUSE METAL FUME FEVER WITH FLU-LIKE SYMPTOMS AND KIDNEY AND LIVER DAMAGE. UNDER HIGH TEMPERATURES, HEXAVALENT CHROMIUM MAY BE PRODUCED, IF IN THE INSOLUBLE FORM, IT IS A CONFIRMED HUMAN CARCINOGEN. THIS PRODUCT MAY ALSO CONTAIN NICKEL AND COBALT. INHALATION OF NICKEL OR COBALT DUST OR FUME MAY RESULT IN INFLAMMATION OF THE RESPIRATORY TRACT. NICKEL AND COBALT HAVE BEEN IDENTIFIED AS POTENTIAL HUMAN CARCINOGENS.

IF COATED WITH OIL, MAY CAUSE SKIN IRRITATION/DERMATITIS BY CONTACT. WELDING FUME IS LISTED AS A POSSIBLE CARCINOGENIC TO HUMANS.

READ THE STAINLESS STEEL MATERIAL SAFETY DATA SHEET (MSDS) ON FILE WITH YOUR EMPLOYER BEFORE WORKING WITH THIS MATERIAL

- \* If processing or recycling produces particulate, use exhaust ventilation or other controls designed to prevent exposure to workers. Examples of such activities include melting, welding, grinding, abrasive sawing, sanding and polishing. Any activity which abrades the surface of this material can generate airborne particulate. Use respiratory protection (P100, quantitative fit testing required) if exposures exceed the permissible limits.
- \* The Occupational Safety and Health Administration (OSHA) have set mandatory limits on occupational exposures.
- \* Stainless Steel, in solid form and as contained in finished products presents no special health risk.
- \* Sold for manufacturing purposes only. This product can be recycled; contact your sales representative.

The Occupational Safety and Health Administration require employers to provide training in the proper use of this product.

For additional information, call or write to Copper and Brass Sales, 22355 West Eleven Mile Road, Southfield, MI 48034, telephone 248-233-5600, or visit our web site @ [www.copperandbrass.com](http://www.copperandbrass.com).



# Certificate of Test



\*\*\*\*\*  
\* CERTIFICATION \*  
\*\*\*\*\*

HEAT A2195A ORDER 0476410/001 SON 760041 BOL 0135091 TAG A771893 01/10/06

SHIP TO:  
COPPER & BRASS SALES  
6555 EAST DAVISON

DETROIT

MI 48212,

----- YOUR ORDER & DATE -----  
CI1312 1/10/06 CUST# COPBRA01 CUST TAG#408866-2

----- ITEM DESCRIPTION -----  
GRADE 17-4  
Size 17-4 HRART RND BAR 4-1/2 STD Country of Melt: BRI  
Ship Condition A Country of Mfg.: BRI  
NAFTA Country of Origin is Country of Melt

Total Bundles 2 SON Weight 1414

----- SPECIFICATIONS -----  
AMS 2303E AMS 5643Q  
ASME SA564 E01 A05 ASTM A484 03A  
DIN 50049/EN 10204 3.1B AISI 630, UNS S17400  
COPPER & BRASS 17-4 PH MAXX MAXX STAINLESS STEEL BAR  
ASTM A564 04 TYPE 630 NO WELD REPAIR  
FREE OF MERCURY CONTAMINATION

----- MECHANICAL & OTHER TESTS -----  
Test Condition H900  
Hardness as shipped (341 HBW ) Hardness as tested (388 HBW )  
Hardness as shipped 37 HRC Hardness as tested 42 HRC  
Grain size 7.0 Tensile strength, KSI (MPa) 199.0 (1372)  
Micro OK 0.2% Yield Strngth, KSI (MPa) 173.0 (1193)  
Intergranular corrosion OK  
Macro OK  
Elongation % in 4D 15.0  
Reduction of area % 40.0  
Ferrite .4  
Hardenability HRC42

----- CHEMICAL COMPOSITION -----  
Carbon (C) .060 Manganese (Mn) .910  
Phosphorus (P) .025 Sulphur (S) .002  
Silicon (Si) .350 Chromium (Cr) 15.710  
Nickel (Ni) 4.200 Copper (Cu) 3.270  
Moly (Mo) .090 Nitrogen (N) .040  
Columbium (Cb) .310 Aluminum (Al) .027  
Tin (Sn) .005  
Columbium/  
Tantalum (Cb+Ta) .310  
Iron (Fe) Balance  
Frequency .000 Severity .000  
Melt Practice EAF  
Refining Practice AOD  
De-long Ferrite

Knowingly & willfully falsifying or concealing a material act on this form, or making false, fictitious or fraudulent statements or representations herein could constitute a felony punishable under federal statutes.

We hereby certify that the test results shown in this report are correct and accurate as contained in the records of the company and are in compliance with the specifications, codes, and standards listed above.

M.F. Marcanio, Quality Manager

*M.F. Marcanio*